

ABSTRACT OF THE DISCLOSURE

Provided is a process for producing a fine carbon fiber by a method of thermal decomposition of at least one organic compound containing an IUPAC group 16 element in the periodic table using ultra fine particles of at least one transition metal as a catalyst, wherein a gas obtained by separating fine carbon fiber from gas coming out from a reaction furnace is cooled to further collect fine carbon fiber still present in the gas. After cooling, at least a part of the above gas is cooled again to remove unwanted condensates and by-products after which the gas is recycled to the reaction furnace. Water and the like are then separated from the condensate to further recycle unreacted raw material organic compound removed during condensation.